

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. Course: ZOOLOGY 571 – PALAEOBIOLOGY OF VERTEBRATES

Lecture Sections: L01 MWF 0900-0950 SB 105 WINTER 2016

Instructor(s): Dr. J. Theodor BI 353 210-9819 jtheodor@ucalgary.ca

D2L: ZOOL 571 L01 – (Winter 2016) – Palaeobiology of Vertebrates

Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. **PREREQUISITES:** Zoology 377 or 379
See section 3.5.C in the Faculty of Science section of the online Calendar
(<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

ANTIREQUISITES: Credit for either Zoology 571 and either of Zoology 571.01 or 571.02 and Zoology 571 will not be allowed.

NOTE: Prior completion of Geology 201 or 209 is strongly recommended. Offered in odd-even academic years.

3. **GRADING:** The University policy on grading and related matters is described in “Academic Regulations, sections F.1 and F.2” of the online University Calendar (<http://www.ucalgary.ca/pubs/calendar/current/f-1.html> and <http://www.ucalgary.ca/pubs/calendar/current/f-2.html>) In determining the overall grade in the course the following weights will be used:

Midterm Examination	20%	In Class	Feb. 26/16
Term Paper	20%		
Peer review of term papers	10%		
Discussion questions	5%		
Discussion Participation	15%		
Final Examination	30%		

There will be a final examination scheduled by the Registrar. Each piece of work (midterm test, term paper, peer reviews, discussion questions, participation in discussion, and lecture final examination) submitted by the student will be assigned a percentage score. The student’s average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

4. **Missed Components of Term Work.** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student’s responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.

5. Dates and times of class exercises held outside of class hours: There may be one field trip, TBA, but it will not be mandatory.

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **EXAMINATION POLICY:** No electronic or written aids (eg. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper. Students should also read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>.
7. In this course, the quality of the student’s writing in the term paper assignment will be factor in the evaluation of this assignment. See also <http://www.ucalgary.ca/pubs/calendar/current/e-2.html>.
8. **STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students are expected to be familiar with <http://www.ucalgary.ca/pubs/calendar/current/sc-5-1.html> of the on-line calendar. See also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>.

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

ZOOLOGY 571
VERTEBRATE PALAEOBIOLOGY

TERM:	WINTER 2016	SECTION NO: 01
PREREQUISITE(S):	Zoology 377 or 379 (Note: Geology 201 or 209 is strongly recommended)	
	Students may not register in a course unless they have a grade of at least C- in each prerequisite course.	
COURSE COORDINATOR:	Dr. J. Theodor 210-9819 BI 353	jtheodor@ucalgary.ca
LECTURERS:	Dr. J. Theodor	
LECTURES:	MWF	0900-0950 SB 105
DISCUSSION SESSION:	W	1200 ES 920
MARK DISTRIBUTION:	A. <u>Composition of Final Grade</u>	
	Midterm Examination (February 26)	20%
	Term Paper (Due March 23; final revisions due April 11)	20%
	Peer review of term papers (March 30)	10%
	Discussion questions	5%
	Discussion participation	15%
	Final Examination	30%
	B. <u>Final Exam</u>	
	There will be a Final Examination scheduled by the Registrar's Office.	
TEXTS:	<u>Required:</u> <u>Vertebrate Palaeontology</u> , 4 th .ed. Blackwell Publishing: Oxford M. J. Benton.	
	<u>Recommended:</u> <u>Patterns and Processes of Vertebrate Evolution</u> . Cambridge University Press: Cambridge 1997. R.L. Carroll.	
	<u>Endless Forms Most Beautiful: the new science of Evo Devo</u> , W. W. Norton & Co.: New York 2005. S. B. Carroll.	
	<u>Major transitions in vertebrate Evolution</u> , 1 st Ed., Indiana University Press: 2007. Anderson, J & Hans-Dieter Sues.	

SPECIFIC DATES

Interim report for Term Paper Due	February 11
Mid-Term Examination	February 26
Term Paper Due	March 23
Term paper peer reviews	March 30
Term Paper final revisions due	April 11

In this course we will survey the fossil record of the vertebrate groups to examine their morphology and known diversity of different groups through time, understand major trends in their evolution, and major changes in their environments through geologic time. We will use both palaeontological and neontological information to understand evolutionary trends. We will also examine the ways in which palaeontological information may be used to interpret vertebrate evolution and in systematics.

We will be broadening our approach by examining certain ideas in more detail and, in the process, discovering how palaeontologists work, what information is important to them from the perspectives of neontology and palaeontology, and how information from disparate fields is brought together to help answer complex evolutionary problems.

Discussions:

The days for which discussions are scheduled are marked on the schedule. Papers will be assigned from the links posted on the course D2L site for you to access online (and print, if you wish). The class members will be responsible for preparing questions for discussion and exploration, each preparing a minimum of one question for discussion each week, posted on the D2L site by the evening before the session. It is thus the responsibility of each student to participate fully. It is the responsibility of all class members to fully appraise the assigned readings for discussion sessions, and to come prepared with questions to ask and discuss.

The discussions are meant to enhance your understanding of palaeobiology, so feel free to raise questions about concepts and ideas that you do not understand, or which require further explanation, as well as questions about why particular points raised by Benton or the other readings have been brought forward. You should take the opportunity to consult these primary sources to enhance your understanding of the material. I encourage you to discuss the readings collectively before class and to devise approaches to questions that will work to enhance the group's understanding.

Letter Grade	Course percentage
A+	Reserved for outstanding performance
A	85%
A-	82%
B+	79%
B	76%
B-	72%
C+	68%
C	64%
C-	60%
D+	55%
D	50%
F	<50%

ZOOLOGY 571

WINTER 2016 SCHEDULE

January	11	Introduction to the course; The fossil record: geologic time and fossilization	
	13	Origin of bone and cartilage	
	15	Jawless 'fishes' and the origin of jaws	
	18	Early diversification of gnathostomes	
	20	The origin of paired fins	
	22	Cartilaginous 'fishes'	
	25	Actinopterygians and Sarcopterygians	
	27	Teleostei	
	29	Origin of limbs and the transition to land	
	February	01	Evolution of the impedance matching ear
03		Early tetrapod diversity and the origin of Lissamphibia	
05		Lepospondyli and Temnospondyli	
08		Origin of Amniota	
09		Origin and radiation of Turtles	
11		Term paper topic due Lepidosauria	
14		Reading Week	
16		Reading Week	
18		Reading Week	
22		Interim progress report due Origin of snakes	
24		Back to the water 1: marine reptiles	
26		Midterm examination (IN CLASS)	
March		29	Archosauromorpha: basal forms, phylogeny and the importance of ankles
		02	Crurotarsi: corcodiles and much much more
	04	Ornithodira: pterosaurs and basal dinosaurs	
	07	Phylogeny of Dinosauria	
	09	Ornithischia: the bird-hipped dinosaurs	
	11	Saurischia 1: the sauropods	
	14	Saurischia 2: the theropods	
	16	The origin of birds and flight	
	18	Origins and radiation of the Synapsida	
	21	Acquisition of 'mammalian' features	
	23	Term paper due Monotremes and marsupials	
	25	Good Friday, no lecture	
	28	Placentals 1: Euarchontoglires (bats, primates, rodents and rabbits)	
	30	Peer reviews due Placentals 2: Afrotheria	
April	01	Placentals 3: Laurasiatheria	
	04	Placentals 4: Hell on hooves	
	06	Placentals 5: Back to the water, Electric Boogaloo	
	08	Placentals 6: South American mammals	
	11	Revised Term paper due The Great American Interchange and Pleistocene extinctions	

Term Paper

For the term paper you will select a major “event” in the evolution of the vertebrates, either the origin of a major new group with a new adaptation (tetrapods, whales) or a major new ecological niche (herbivory, flight) and document it, using evidence from palaeontology and neontology to produce an integrative synthesis, as in a professional review paper. You will be required to peer review other students papers and give feedback; you will also have the opportunity to revise your paper in response to feedback from the other students. The following guidelines apply:

- (a) Selection of a topic and submission for approval by **January 22, 2016**.
- (b) Submission of an interim report outlining progress to date and literature consulted/requested on **February 11, 2016**.
- (c) Submission of the term paper on **March 23, 2016**.
- (d) Peer reviews due **March 30, 2016**.
- (e) Final revised paper due **April 11, 2016**.